| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 09/671,740 | 09/29/2000 | Mitsuhiro Shibazaki | 000635 | 2061 |

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| EXAMINER |
|---|
| CHANG, SUNRAY |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2128 | |

DATE MAILED: 06/22/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

| | **Application No.** | **Applicant(s)** | |
|---|---|---|---|
| **Office Action Summary** | 09/671,740 | SHIBAZAKI, MITSUHIRO | |
| | **Examiner** | **Art Unit** | |
| | Sunray Chang | 2121 | |

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

## Status

1)☒ Responsive to communication(s) filed on <u>29 September 2000</u>.

2a)☐ This action is **FINAL**.     2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

4)☒ Claim(s) *1-10* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-10* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

## Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on _____ is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☒ All   b)☐ Some *  c)☐ None of:

      1.☒ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage
application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
    Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

## DETAILED ACTION

### *Specification*

1.      The abstract of the Disclosure is objected to since the current abstract is

not a brief narrative of the disclosure as a whole in a <u>single</u> paragraph of 150

words or less commencing on a separate sheet following the claims. [see MPEP

§ 608.01(a)]

### *Claim Rejections - 35 USC § 101*

35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or
> composition of matter, or any new and useful improvement thereof, may obtain a patent
> therefor, subject to the conditions and requirements of this title.

4.      **Claims 1 – 10 are rejected under 35 U.S.C. 101** because *claims 1 – 10*

*are drawn to a method or an apparatus for determining a regular N-polygon*

*figure having vertexes of N in number. It is mathematical algorithm.*

An invention which is eligible for patenting under 35 U.S.C. § 101 is in the

"useful arts" when it is a machine, manufacture, process or composition of

matter, which produces a concrete, tangible, and useful result. The fundamental

test for patent eligibility is thus to determine whether the claimed invention

produces a **"useful, concrete and tangible result."** The test for practical

application as applied by the examiner involves the determination of the following

factors:

(1) "Useful" – The Supreme Court in Diemond v. Diehr requires that the

examiner look at the claimed invention as a whole and compare any asserted

utility with the claimed invention to determine whether the asserted utility is accomplished.

(2) "Tangible" – Applying In re Warmerdam, 33 F.3d 1354, 31 USPQ2d 1754 (Fed. Cir. 1994), the examiner will determine whether there is simply a mathematical construct claimed, such as a disembodied data structure and method of making it. If so, the claim involves no more than a manipulation of an abstract idea and therefor, is nonstatutory under 35 U.S.C. § 101. In Warmerdam the abstract idea of a data structure became capable of producing a useful result when it was fixed in a tangible medium which enabled its functionality to be realized.

(3) "Concrete" – Another consideration is whether the invention produces a "concrete" result. Usually, this question arises when a result cannot be assured. An appropriate rejection under 35 U.S.C. § 101 should be accompanied by a lack of enablement rejection, because the invention cannot operate as intended without undue experimentation.

The examiner respectfully submits, under current PTO practice, that the claimed invention does not recite either a useful, concrete, or tangible result and is merely drawn to a mathematical algorithm.

- The claimed invention is not tangible. The claims merely recite an algorithm.

- Further, in accordance with the Federal Circuit decision of State Street Bank v. Signature Financial Groups, 47USPQ2D1596 (Fed Cir 1998), a claimed invention must be directed to the technical

arts. It is considered that the currently claimed invention is not

directed to technology since only a mathematical algorithm is being

claimed.

### Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35

U.S.C. 102 that form the basis for the rejections under this section made in this

Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7.    Claims 1 – 10 are rejected under 35 U.S.C. 102(b) as being anticipated by

David P. Little (SpiroGraph, http://www.math.dartmouth.edu/~dlittle/java/

SpiroGraph/, 1997, and referred to as Little hereinafter).

8.    Regarding independent claims 1 – 10:

-    Little teaches the center point (S) [origin, Line 18, Page 1] of a regular

    N – polygonal figure [Square in Fig. 1, Page 2] to be determined is set

    as a fixed point [origin, Line 18, Page 1]; a point [(R + r, 0), Line 20,

    Page 1], which is distant by a certain length [R + r, Line 20, Page 1]

    from the said center point (S) [origin, Line 18, Page 1] and revolves

    around [large circuit in Fig. 1, Page 2] the center point (S) [origin, Line

    18, Page 1], is set as a first point (E) [(R + r, 0), Line 20, Page 1]; a

    point [reflector, Line 22, Page 1], which is distant by a certain length

[Distance of Point, Line 22, Page 1] from the first point (E) [(R + r, 0),

Line 20, Page 1] and revolves around [small circuit in Fig. 1, Page 2]

the first point (E) [(R + r, 0), Line 20, Page 1], is set as a second point

(M) [reflector, Line 22, Page 1];

- Further, Little teaches the second point (M) revolves around the first

  point (E) at an angular velocity $\omega$, that the first point (E) revolves

  around the center point (S) at an angular velocity $(1 - N)\,\omega$, that the

  first point (E) is away from the center point (S) by a distance ( r ), and

  that the second point (M) is away from the first point (E) by a distance

  $(N - 1)^2$ r, the locus of the second point (M) defines a contour of a

  regular N – polygonal figure to be determined being circumscribed on a

  circle having a radius N (N – 2) r.

By

$$X(\,t\,) = (R + r)\cos(\,t\,) - p \times \cos(\,(R + r)\,t\,/\,r)$$

$$Y(\,t\,) = (R + r)\sin(\,t\,) - p \times \sin(\,(R + r)\,t\,/\,r)$$

Multiplied by a constant angular velocity $\omega$

$$\theta = \omega\,t$$

(Note: Functions in the time domain are the same when written in the frequency domain

and Official Notice is taken of this fact.)

We can get

$$X(\,\theta\,) = (R + r)\cos(\,\theta\,) - p \times \cos(\,(R + r)\,\theta\,/\,r)$$

$$Y(\theta) = (R + r) \sin(\theta) - p \times \sin((R + r)\,\theta/r)$$

Base on

Second point (M) revolves around first point (E) at angular velocity $\omega$

First point (E) is away from the center point (S) by a distance ( r )

According to the value of k = 1 – N is a result of the initial value being set to $2\pi - (2\pi / N)$ which is an arbitrary value. It is inherent for a person with ordinary skill in the art to get the same results as:

- Angular velocity of the first point (M) is (1 – N) $\omega$ is constant.

- Second point (M) is away from first point (E) by distance $(N - 1)^2$ r which is derived from the initial value of $2\pi - (2\pi / N)$.

- The locus of the second point (M) defines a contour of a regular N – polygonal figure to be determined being circumscribed on a circle having radius N (N – 2) r which is derived from the initial value of $2\pi - (2\pi / N)$.

## Conclusion

9.      The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Morrell et al. (U.S. Patent No. 4,074,778) discloses a drilling tool with a center pole and a 1st pole revolving around center pole. Japanese Patent No. 6 – 304805, (1994) discloses a drilling tool and a drilling method. Aarnout Brombacher (Using Computers in Mathematics Instruction, 1997) discloses a Spirograph. Xah Lee (Hypotrochoid, 1998) discloses a

Spirograph. Eric W. Weisstein (Spirograph, mathworld, 1999) discloses a

Spirograph.

Varel, Sr. (U.S. Patent No. 4,763,736) discloses a roller cone bit. Hooker

(U.S. Patent No. 4,114,486) discloses generating spherical surfaces, curve-

selecting adjustable means, and rotation about its axis. Watt (U.S. Patent No.

4,333,368) discloses a spherical surface generating, along the locus of the

radius, cutting tool tip, x–y coordinate machine. Pessier et al. (U.S. Patent No.

5,695,018) discloses bit rotation, a earth-boring bit, a cutter, and gage surface.

Hall et al. ( U.S. Patent No. 4,738,322) discloses roller cone rock bit,

bearing system, polycrystalline diamond. Pessier et al. (U.S. Patent No.

5,996,713) discloses rock bit, cutter, spirals downwardly. Oliver Kerr (X2 Applied

Mathematics 1998/1999, http://www.city.ac.uk/mathematics/X2ApplMaths/

index.html, 09/11/1998) discloses Orbits of a planet around the sun, and angular

velocity. Xah Lee (Coins of the Realm, www.xahlee.org/SpecialPlaneCurves_dir/

specialplaneCurves.html, discloses epitrochoid, spiral, Hyperbola, and

Hypocycloid.


10.     Any inquiry concerning this communication or earlier communications from

the examiner should be directed to Sunray Chang whose telephone number is

703-305-8744. The examiner can normally be reached on M-F 7:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the

examiner's supervisor, Anthony Knight can be reached on 703-308-3179. The

fax phone number for the organization where this application or proceeding is

assigned is 703-872-9306.

Any inquiry of a general nature or relating to the status of this application

or proceeding should be directed to the receptionist whose telephone number is

703-746-3506.

Anthony Knight
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Patent Examiner
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Technology Center 2100
U.S. Patent and Trademark Office

June 14, 2004